FIG. 1

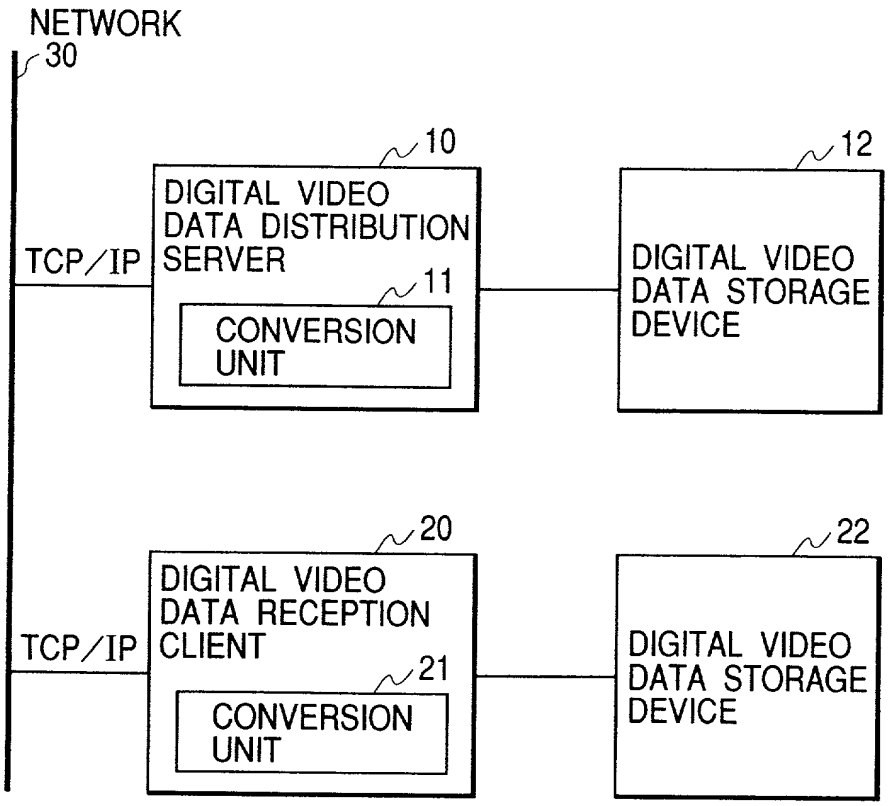

NETWORK
30
10
DIGITAL VIDEO DATA DISTRIBUTION SERVER
11
CONVERSION UNIT
TCP/IP
12
DIGITAL VIDEO DATA STORAGE DEVICE
20
DIGITAL VIDEO DATA RECEPTION CLIENT
21
CONVERSION UNIT
TCP/IP
22
DIGITAL VIDEO DATA STORAGE DEVICE

FIG. 2

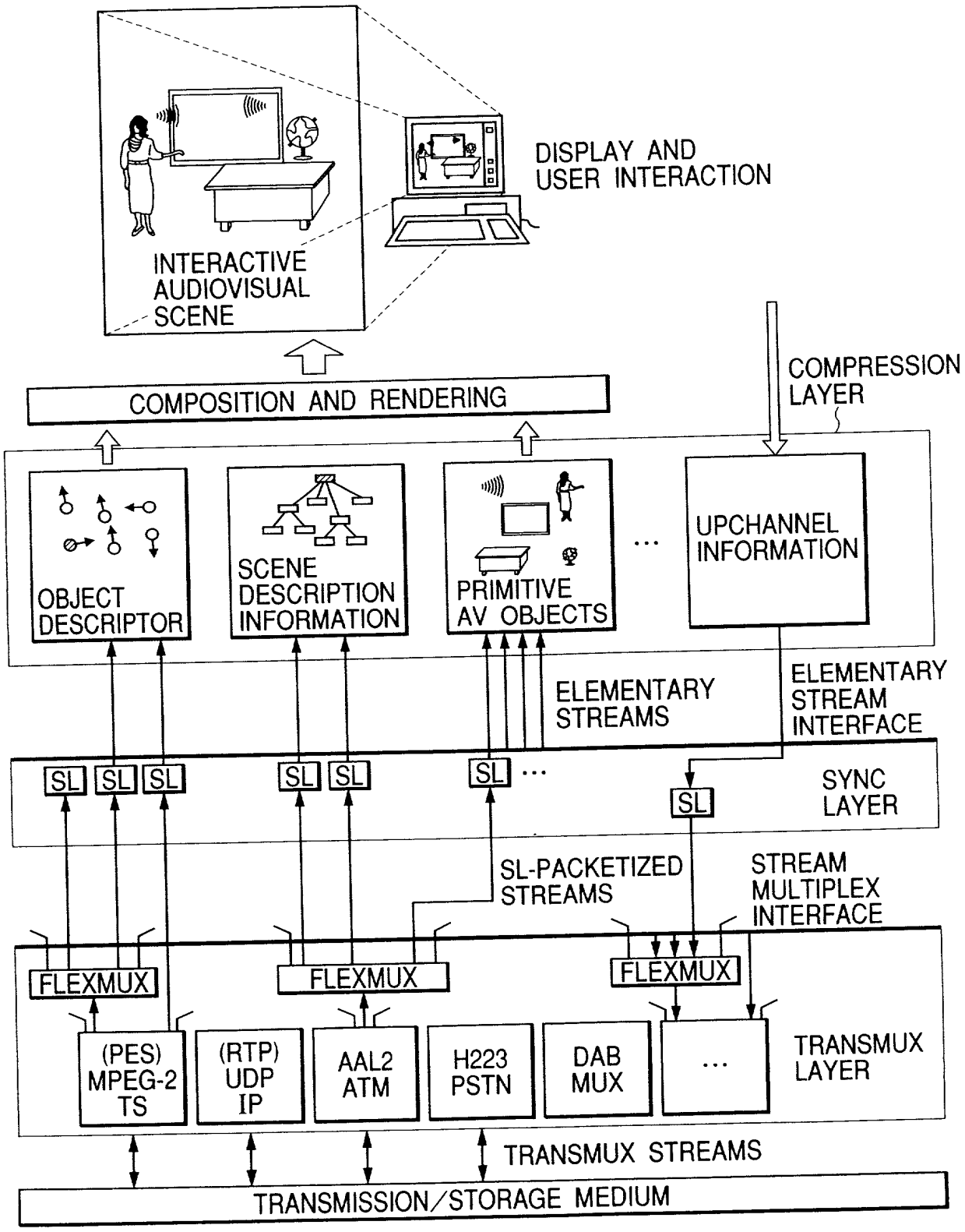

INTERACTIVE AUDIOVISUAL SCENE
DISPLAY AND USER INTERACTION
COMPOSITION AND RENDERING
COMPRESSION LAYER
OBJECT DESCRIPTOR
SCENE DESCRIPTION INFORMATION
PRIMITIVE AV OBJECTS
UPCHANNEL INFORMATION
ELEMENTARY STREAMS
ELEMENTARY STREAM INTERFACE
SL
SYNC LAYER
SL-PACKETIZED STREAMS
STREAM MULTIPLEX INTERFACE
FLEXMUX
(PES) MPEG-2 TS
(RTP) UDP IP
AAL2 ATM
H223 PSTN
DAB MUX
TRANSMUX LAYER
TRANSMUX STREAMS
TRANSMISSION/STORAGE MEDIUM

FIG. 3

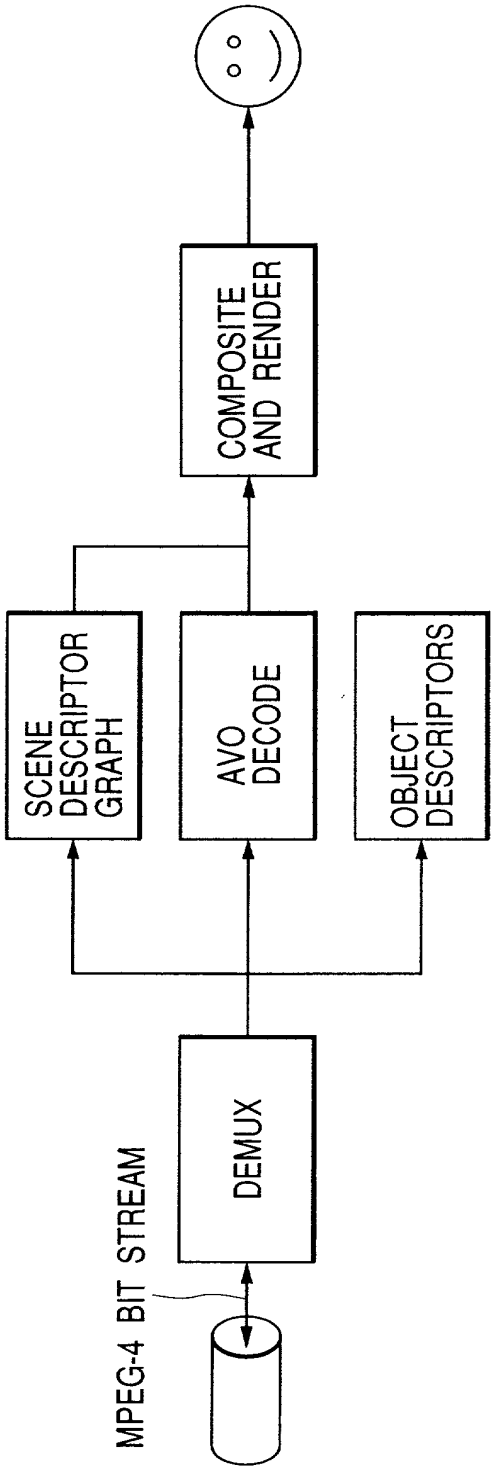

MPEG-4 BIT STREAM
DEMUX
SCENE DESCRIPTOR GRAPH
AVO DECODE
OBJECT DESCRIPTORS
COMPOSITE AND RENDER

FIG. 4

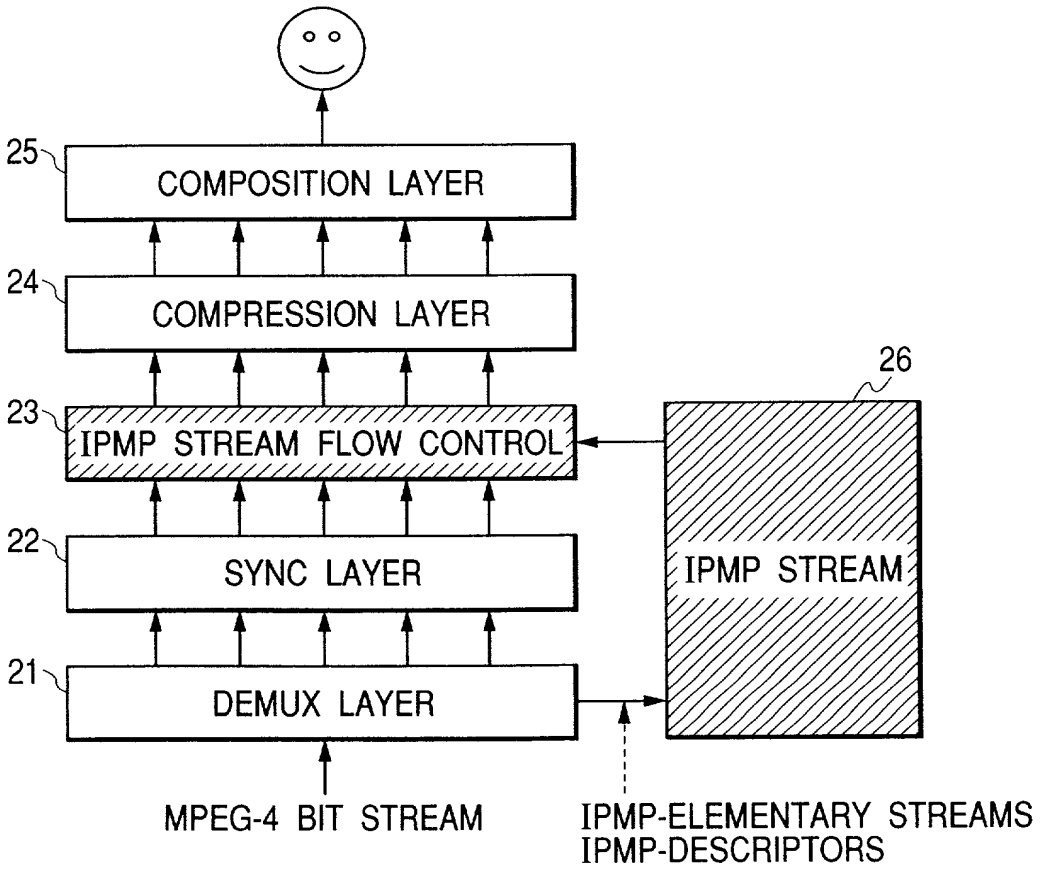
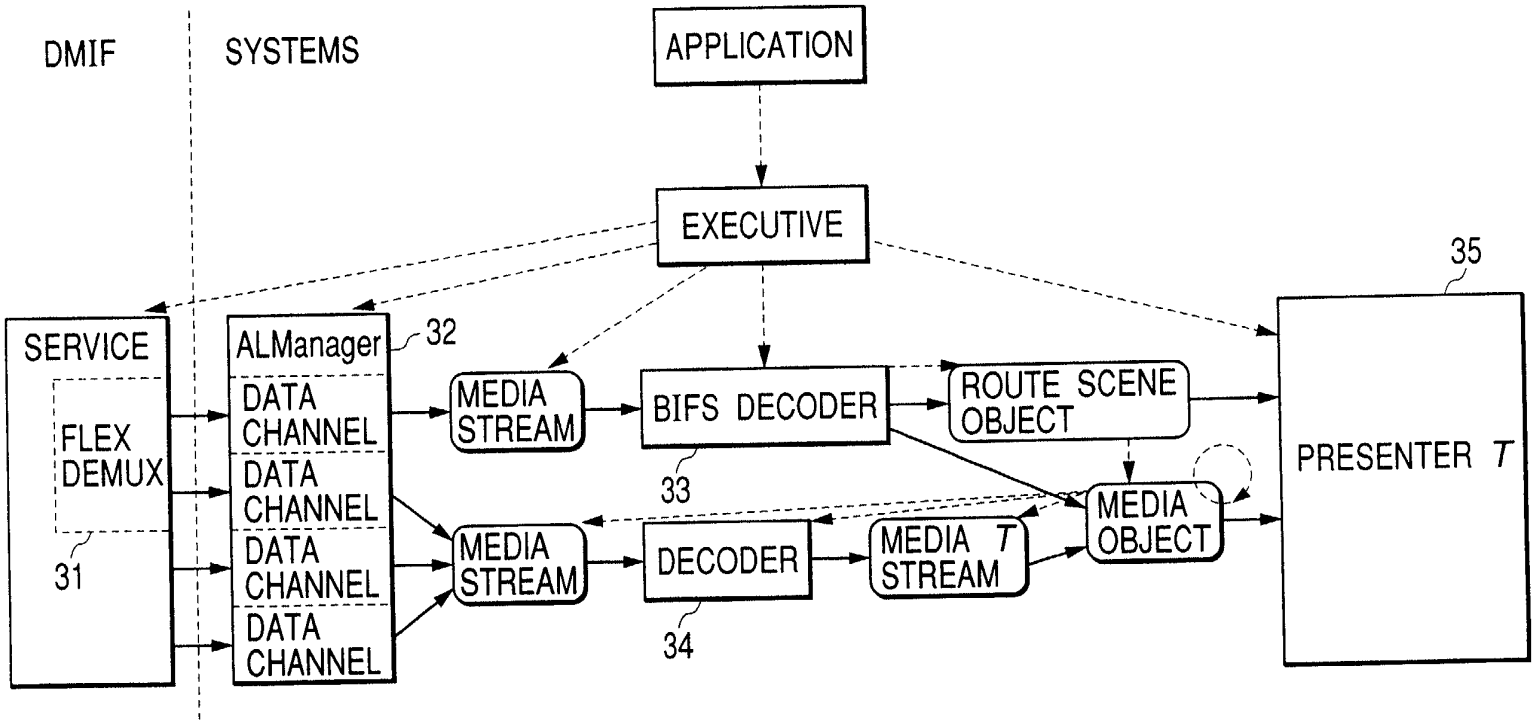

25
COMPOSITION LAYER
24
COMPRESSION LAYER
26
23
IPMP STREAM FLOW CONTROL
22
SYNC LAYER
IPMP STREAM
21
DEMUX LAYER
MPEG-4 BIT STREAM
IPMP-ELEMENTARY STREAMS
IPMP-DESCRIPTORS

FIG. 5



T REPRESENTS A COMPONENT WHICH USES A CLOCK TO CONTROL ITS OPERATION

POINTS FROM THE OBJECT WHICH INSTANTIATES THE OBJECT POINTED TO

SHOWS THE DIRECTION OF DATA MOVEMENT

REPRESENTS A COMPONENT RUNNING AS A SEPARATE THREAD

REPRESENTS A COMPONENT WHICH IS A SHARED DATA STRUCTURE

FIG. 6

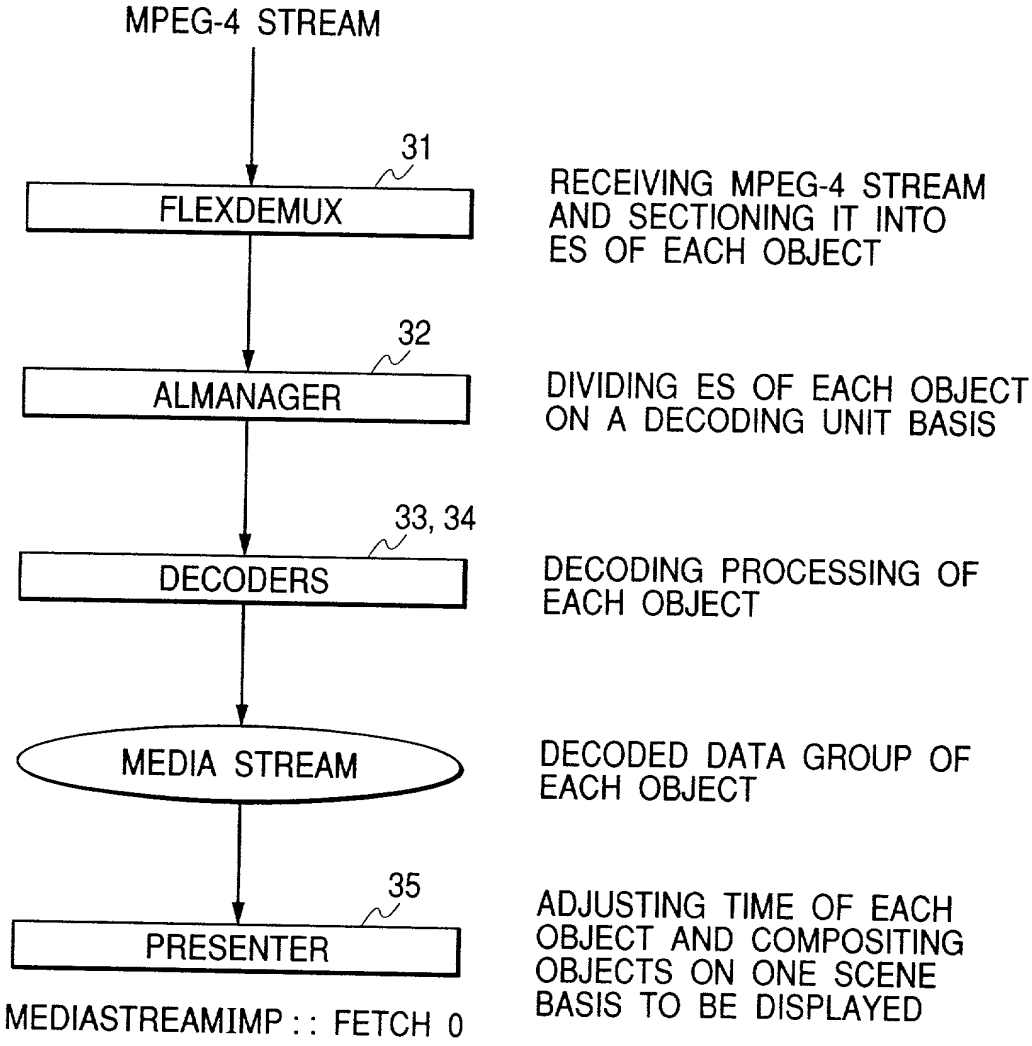

MPEG-4 STREAM
31
FLEXDEMUX
RECEIVING MPEG-4 STREAM AND SECTIONING IT INTO ES OF EACH OBJECT
32
ALMANAGER
DIVIDING ES OF EACH OBJECT ON A DECODING UNIT BASIS
33, 34
DECODERS
DECODING PROCESSING OF EACH OBJECT
MEDIA STREAM
DECODED DATA GROUP OF EACH OBJECT
35
PRESENTER
ADJUSTING TIME OF EACH OBJECT AND COMPOSITING OBJECTS ON ONE SCENE BASIS TO BE DISPLAYED
MEDIASTREAMIMP : : FETCH 0

FIG. 7

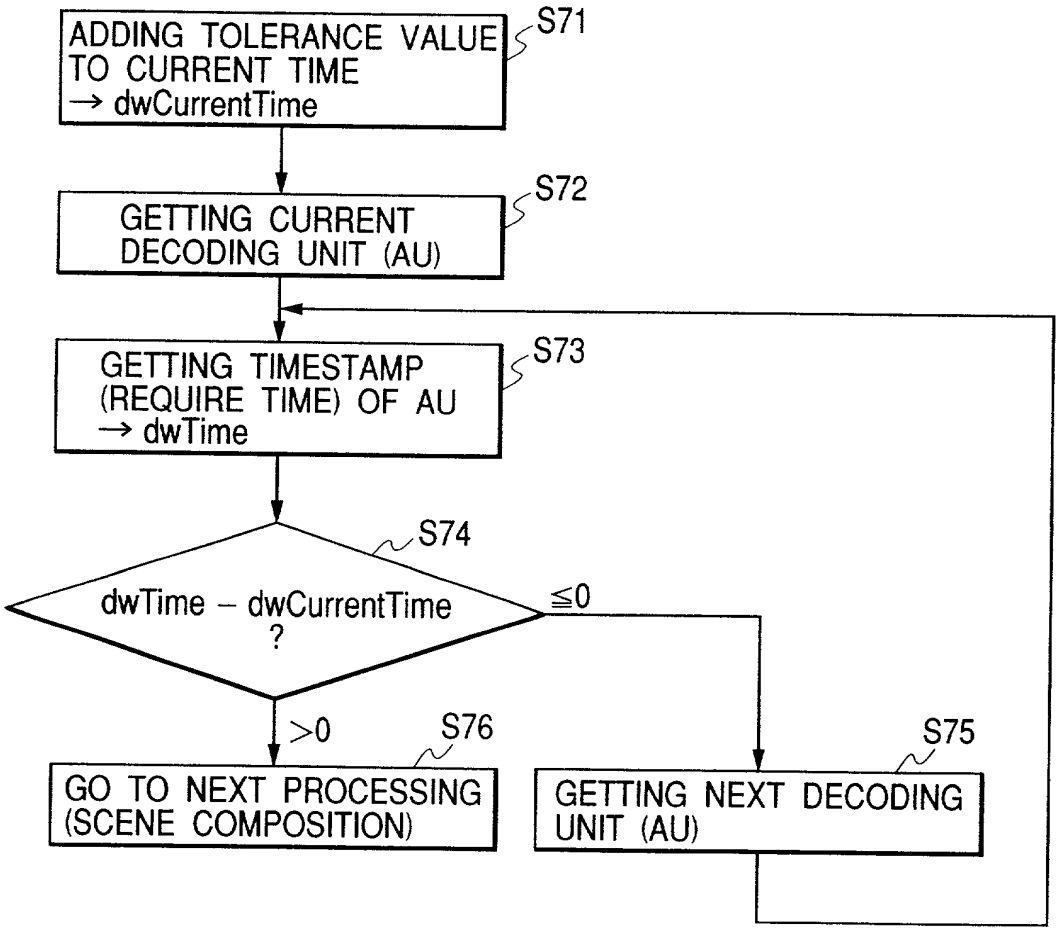

ADDING TOLERANCE VALUE TO CURRENT TIME → dwCurrentTime
S71
GETTING CURRENT DECODING UNIT (AU)
S72
GETTING TIMESTAMP (REQUIRE TIME) OF AU → dwTime
S73
dwTime – dwCurrentTime ?
S74
≦0
>0
S76
GO TO NEXT PROCESSING (SCENE COMPOSITION)
S75
GETTING NEXT DECODING UNIT (AU)

FIG. 8

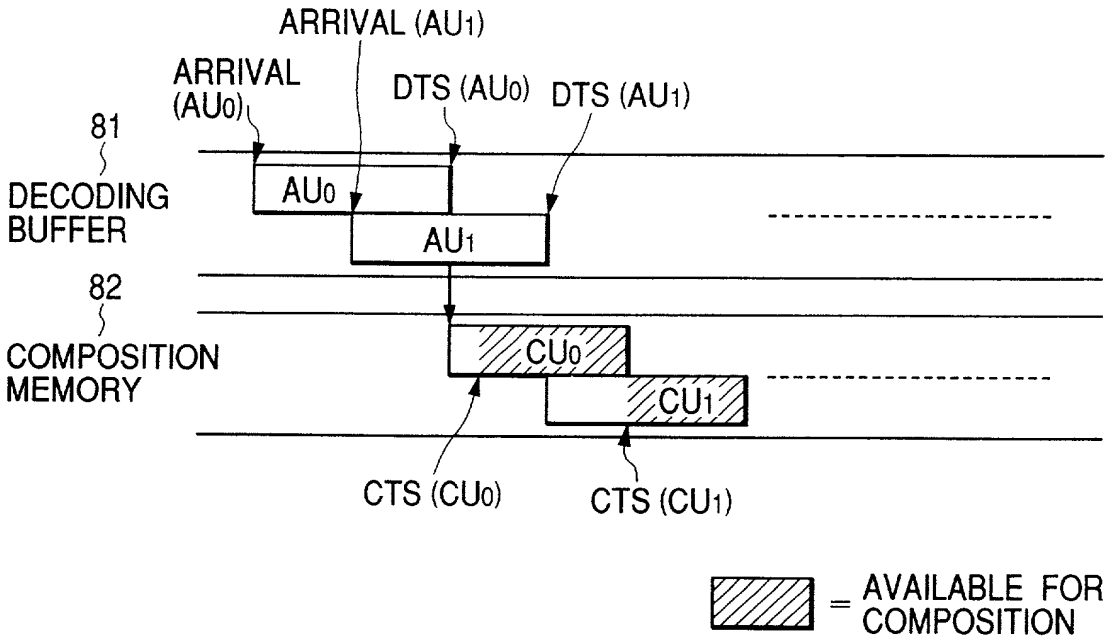


FIG. 9

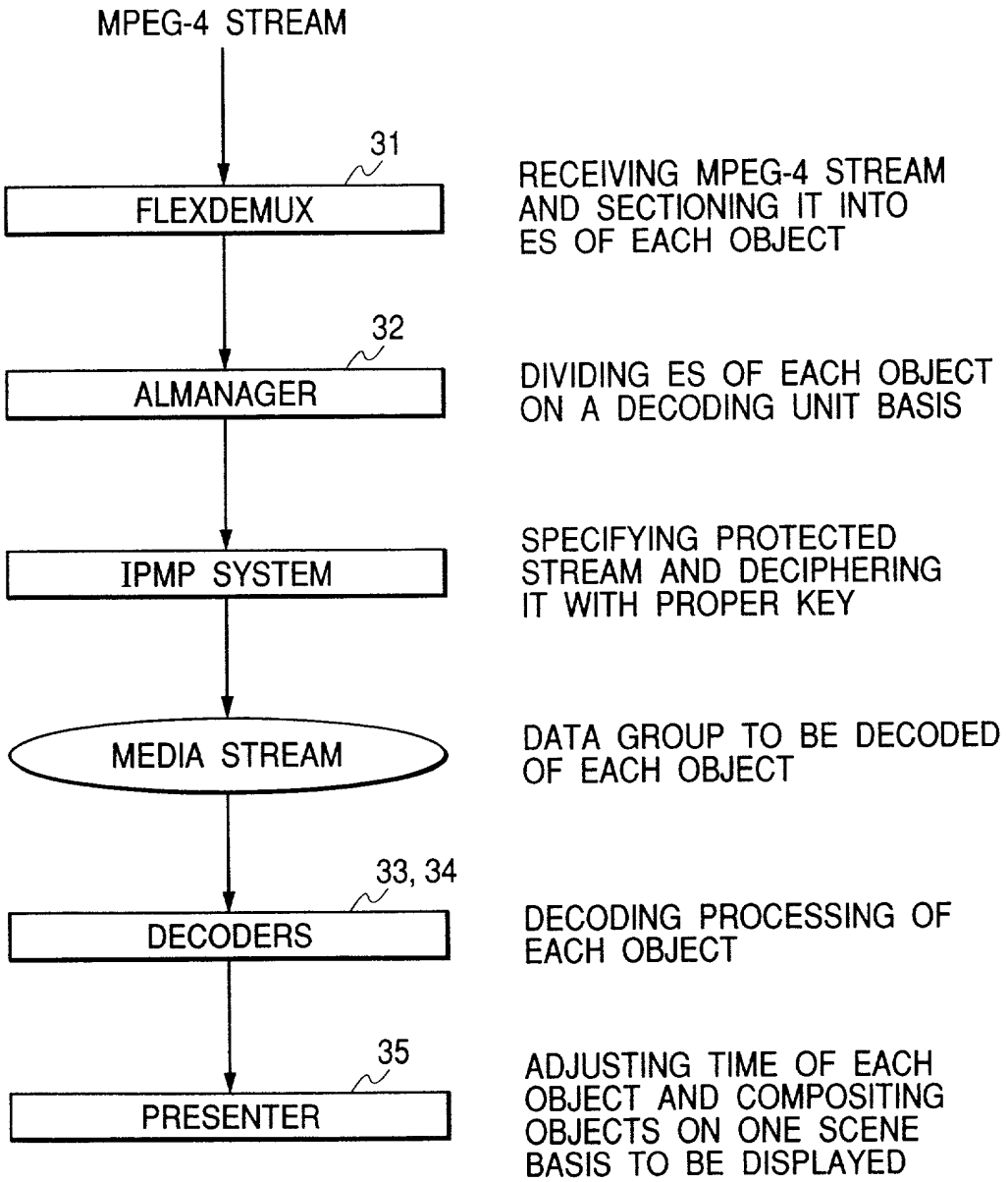

MPEG-4 STREAM
31
FLEXDEMUX
RECEIVING MPEG-4 STREAM AND SECTIONING IT INTO ES OF EACH OBJECT
32
ALMANAGER
DIVIDING ES OF EACH OBJECT ON A DECODING UNIT BASIS
IPMP SYSTEM
SPECIFYING PROTECTED STREAM AND DECIPHERING IT WITH PROPER KEY
MEDIA STREAM
DATA GROUP TO BE DECODED OF EACH OBJECT
33, 34
DECODERS
DECODING PROCESSING OF EACH OBJECT
35
PRESENTER
ADJUSTING TIME OF EACH OBJECT AND COMPOSITING OBJECTS ON ONE SCENE BASIS TO BE DISPLAYED

FIG. 10

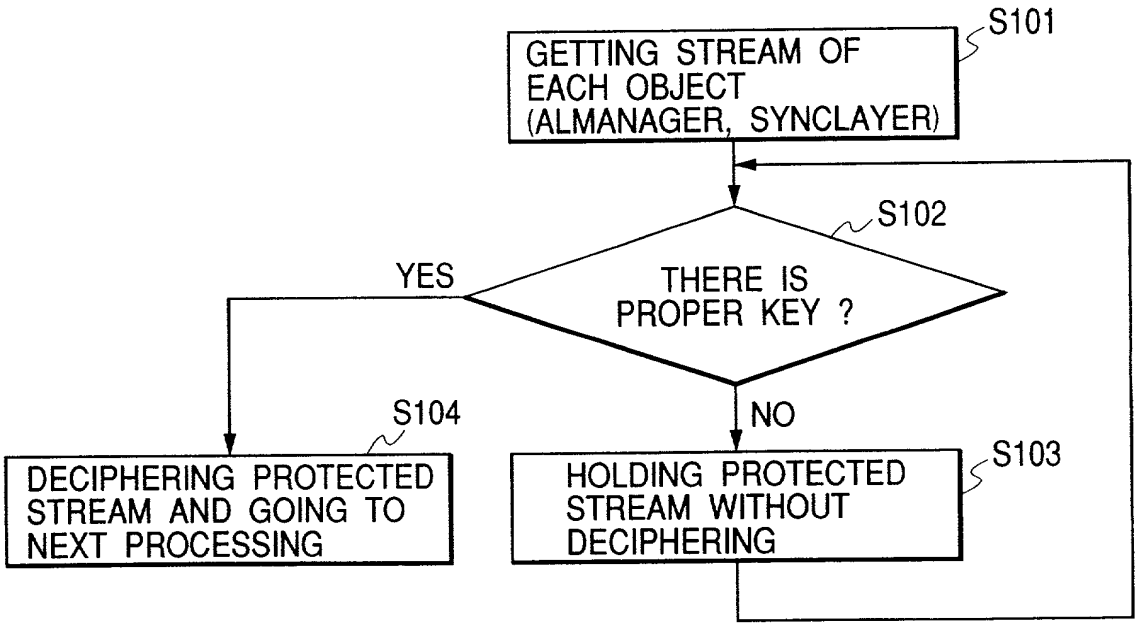


FIG. 11

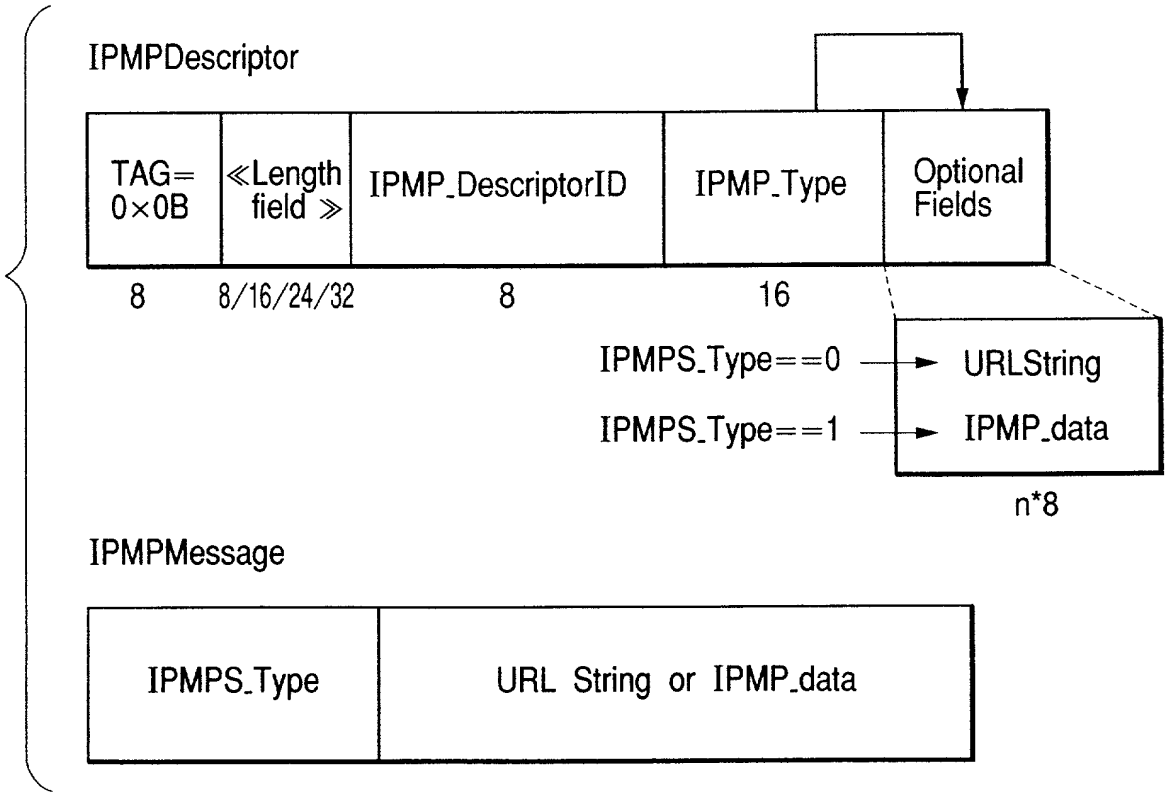

IPMPDescriptor
TAG= 0×0B
≪Length field ≫
IPMP_DescriptorID
IPMP_Type
Optional Fields
8
8/16/24/32
8
16
IPMPS_Type==0
URLString
IPMPS_Type==1
IPMP_data
n*8
IPMPMessage
IPMPS_Type
URL String or IPMP_data

FIG. 12

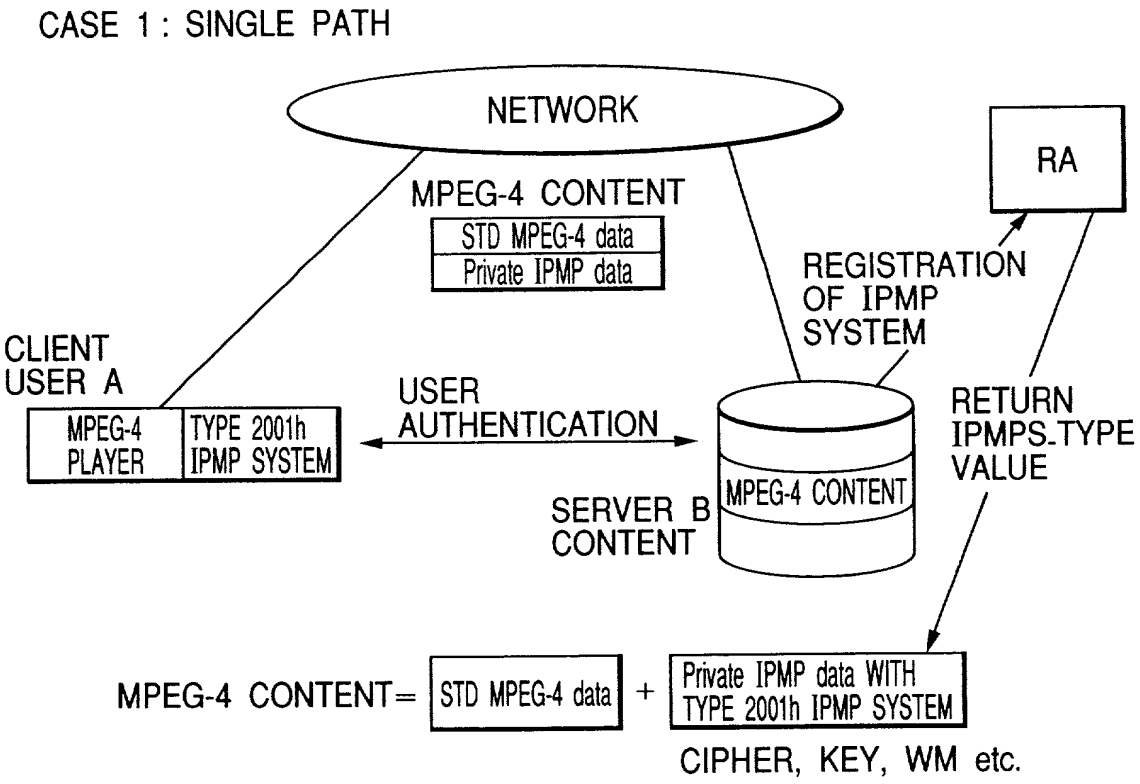

CASE 1 : SINGLE PATH
NETWORK
RA
MPEG-4 CONTENT
STD MPEG-4 data
Private IPMP data
REGISTRATION OF IPMP SYSTEM
CLIENT USER A
MPEG-4 PLAYER
TYPE 2001h IPMP SYSTEM
USER AUTHENTICATION
MPEG-4 CONTENT
SERVER B CONTENT
RETURN IPMPS_TYPE VALUE
MPEG-4 CONTENT=
STD MPEG-4 data
+
Private IPMP data WITH TYPE 2001h IPMP SYSTEM
CIPHER, KEY, WM etc.

FIG. 13

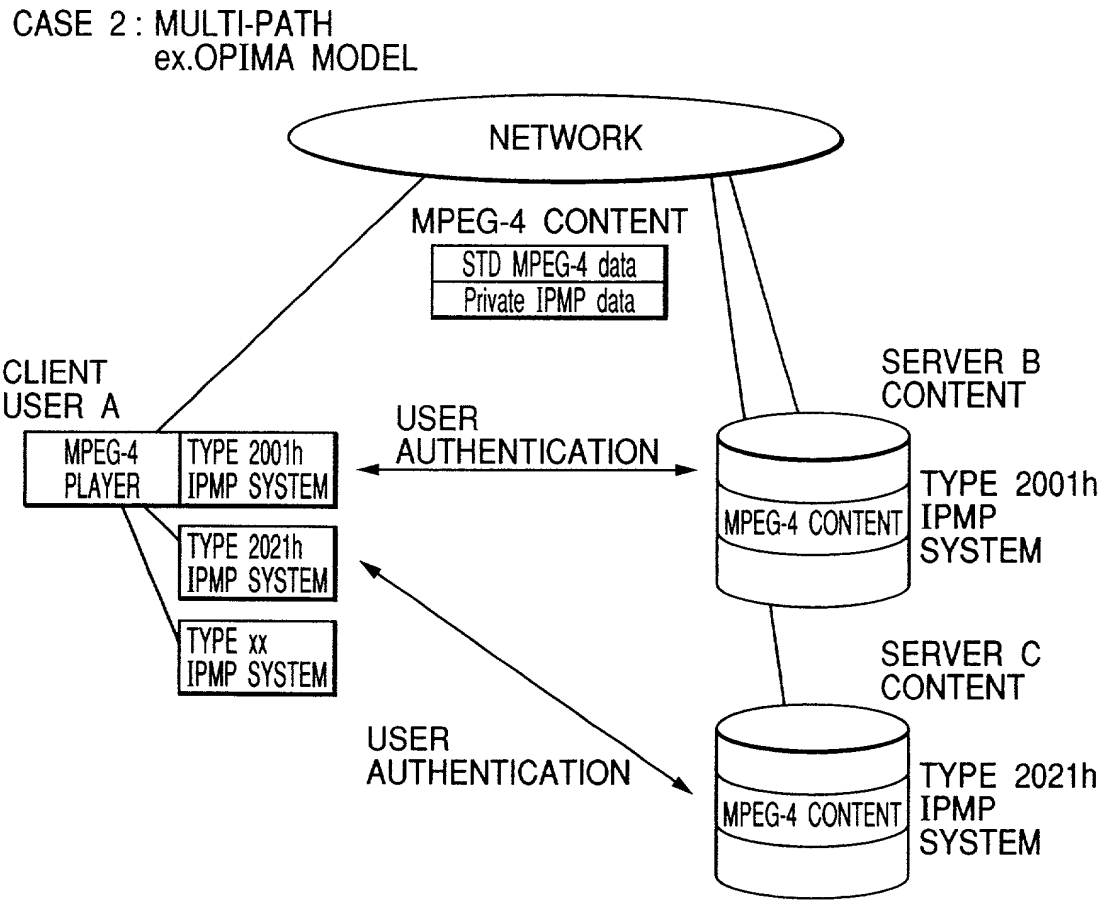

CASE 2 : MULTI-PATH
ex.OPIMA MODEL
NETWORK
MPEG-4 CONTENT
STD MPEG-4 data
Private IPMP data
CLIENT
USER A
MPEG-4
PLAYER
TYPE 2001h
IPMP SYSTEM
TYPE 2021h
IPMP SYSTEM
TYPE xx
IPMP SYSTEM
USER
AUTHENTICATION
USER
AUTHENTICATION
SERVER B
CONTENT
MPEG-4 CONTENT
TYPE 2001h
IPMP
SYSTEM
SERVER C
CONTENT
MPEG-4 CONTENT
TYPE 2021h
IPMP
SYSTEM

FIG. 14

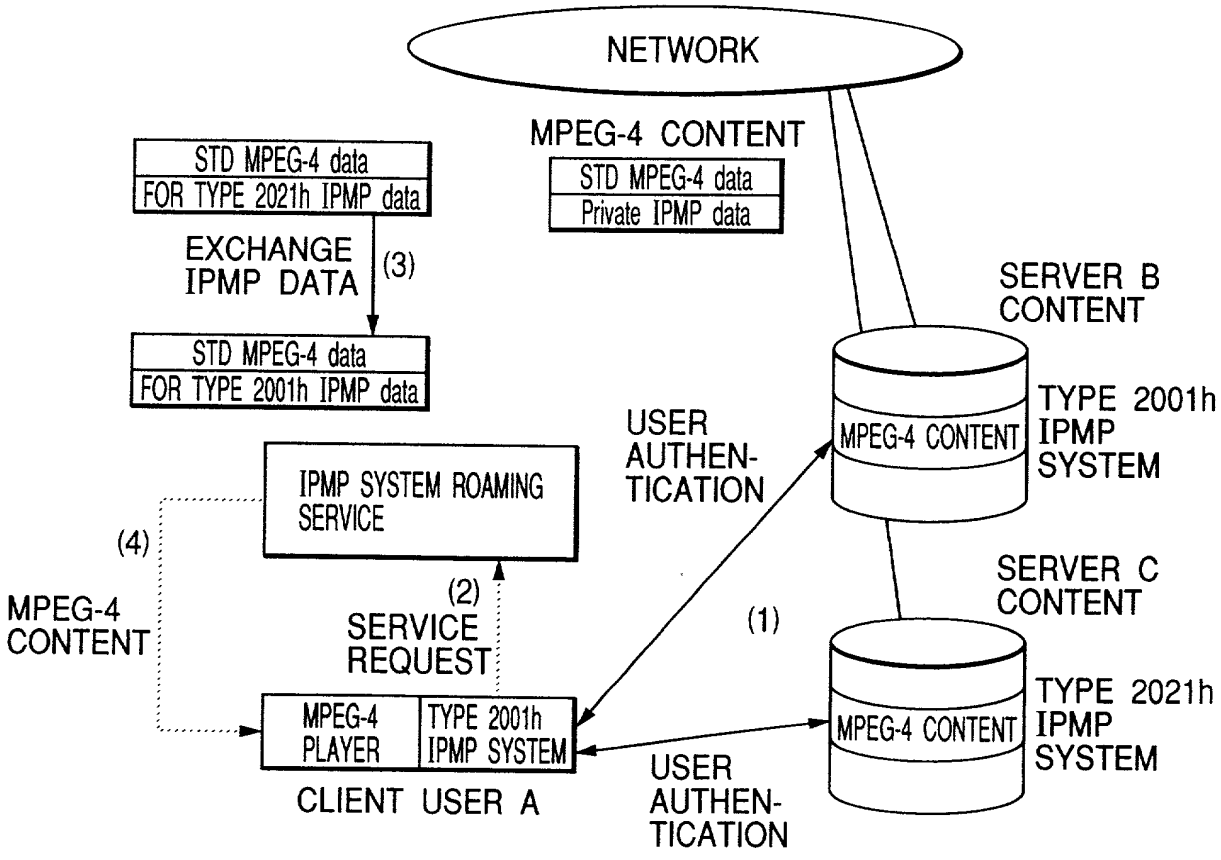

NETWORK
MPEG-4 CONTENT
STD MPEG-4 data
Private IPMP data
STD MPEG-4 data
FOR TYPE 2021h IPMP data
EXCHANGE IPMP DATA
(3)
STD MPEG-4 data
FOR TYPE 2001h IPMP data
SERVER B CONTENT
MPEG-4 CONTENT
TYPE 2001h IPMP SYSTEM
USER AUTHEN-TICATION
IPMP SYSTEM ROAMING SERVICE
(4)
MPEG-4 CONTENT
(2)
SERVICE REQUEST
SERVER C CONTENT
(1)
MPEG-4 CONTENT
TYPE 2021h IPMP SYSTEM
MPEG-4 PLAYER
TYPE 2001h IPMP SYSTEM
CLIENT USER A
USER AUTHEN-TICATION

FIG. 15

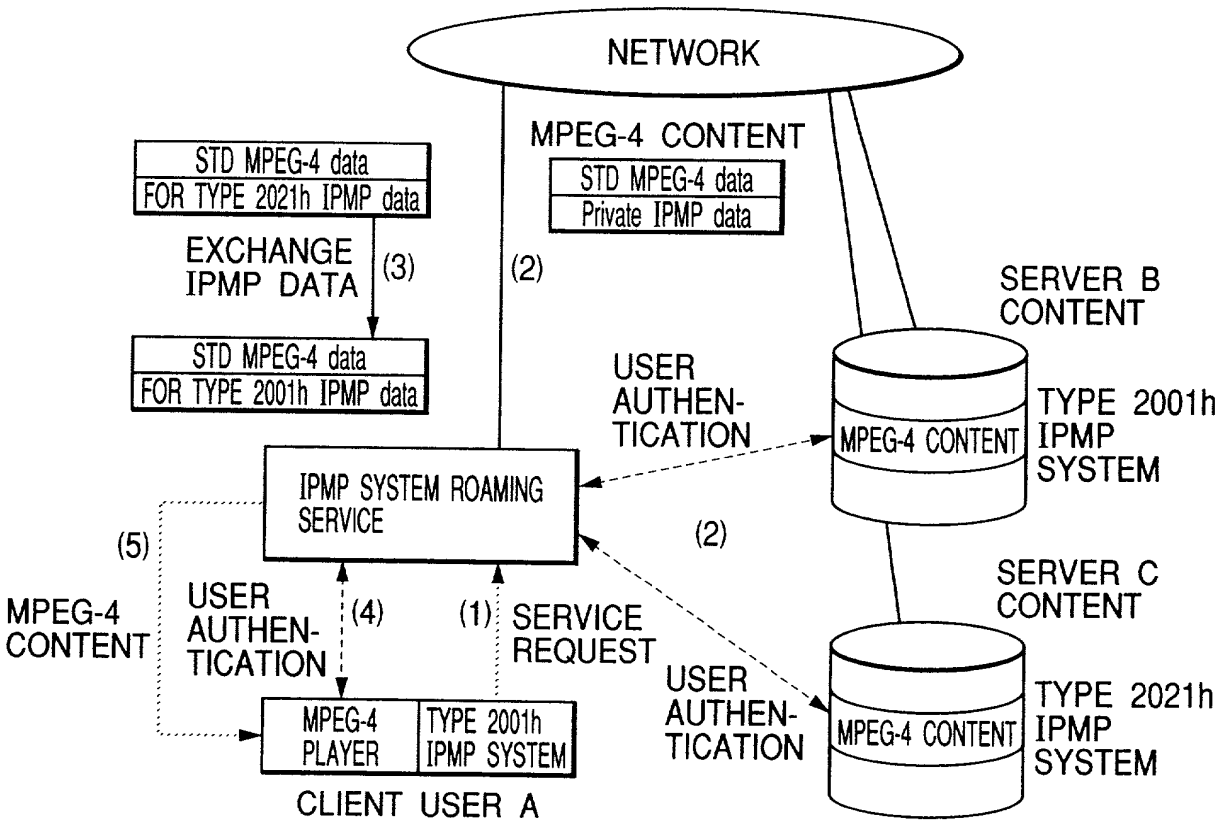

NETWORK
MPEG-4 CONTENT
STD MPEG-4 data
Private IPMP data
STD MPEG-4 data
FOR TYPE 2021h IPMP data
EXCHANGE IPMP DATA
(3)
STD MPEG-4 data
FOR TYPE 2001h IPMP data
(2)
SERVER B CONTENT
USER AUTHEN-TICATION
MPEG-4 CONTENT
TYPE 2001h IPMP SYSTEM
IPMP SYSTEM ROAMING SERVICE
(5)
(2)
SERVER C CONTENT
MPEG-4 CONTENT
USER AUTHEN-TICATION
(4)
(1)
SERVICE REQUEST
USER AUTHEN-TICATION
MPEG-4 CONTENT
MPEG-4 PLAYER
TYPE 2001h IPMP SYSTEM
MPEG-4 CONTENT
TYPE 2021h IPMP SYSTEM
CLIENT USER A

FIG. 16

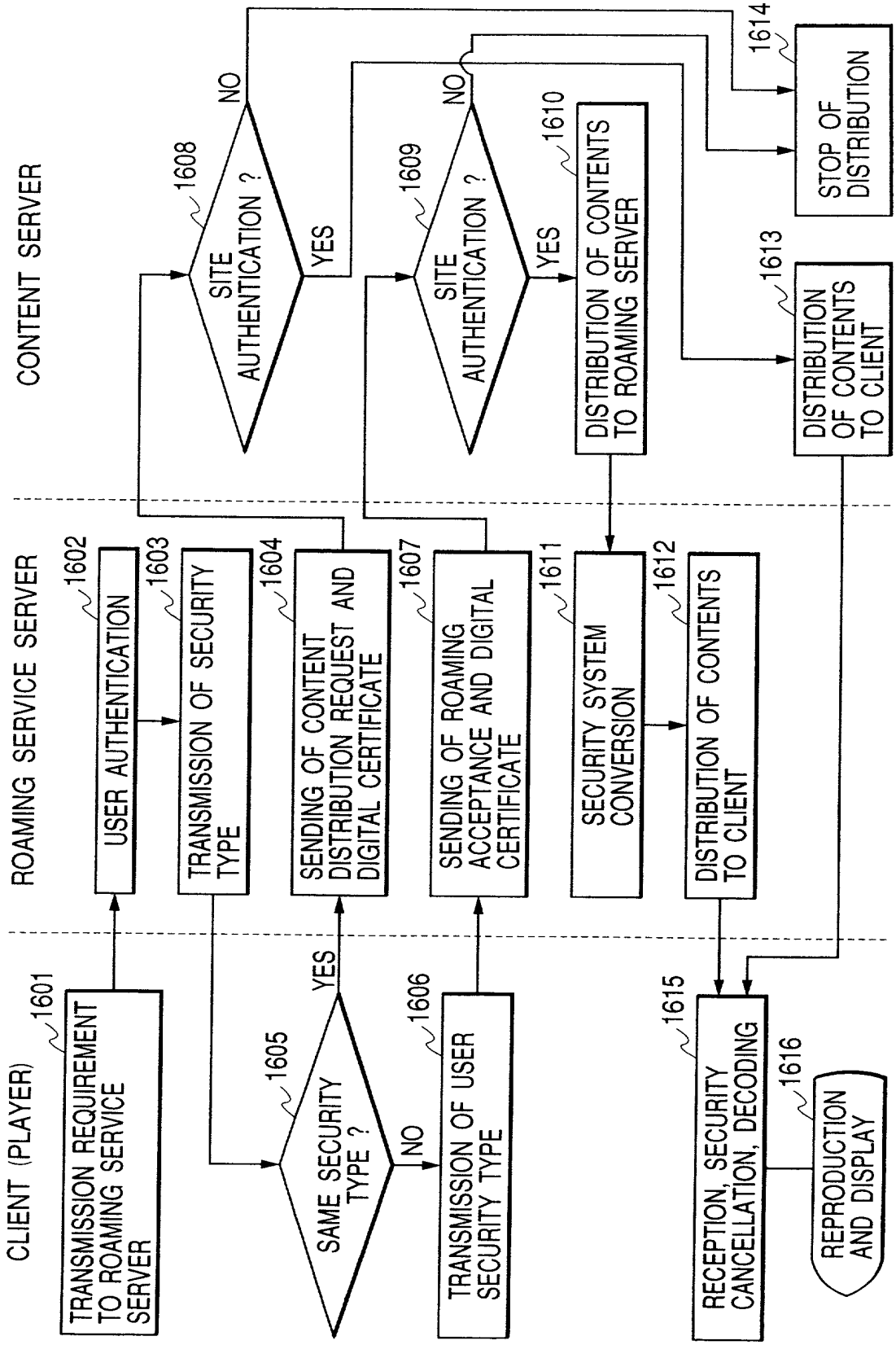

CLIENT (PLAYER)
ROAMING SERVICE SERVER
CONTENT SERVER
1601
TRANSMISSION REQUIREMENT TO ROAMING SERVICE SERVER
1602
USER AUTHENTICATION
1603
TRANSMISSION OF SECURITY TYPE
1604
SENDING OF CONTENT DISTRIBUTION REQUEST AND DIGITAL CERTIFICATE
1605
SAME SECURITY TYPE ?
YES
NO
1606
TRANSMISSION OF USER SECURITY TYPE
1607
SENDING OF ROAMING ACCEPTANCE AND DIGITAL CERTIFICATE
1608
SITE AUTHENTICATION ?
NO
YES
1609
SITE AUTHENTICATION ?
NO
YES
1610
DISTRIBUTION OF CONTENTS TO ROAMING SERVER
1611
SECURITY SYSTEM CONVERSION
1612
DISTRIBUTION OF CONTENTS TO CLIENT
1613
DISTRIBUTION OF CONTENTS TO CLIENT
1614
STOP OF DISTRIBUTION
1615
RECEPTION, SECURITY CANCELLATION, DECODING
1616
REPRODUCTION AND DISPLAY

FIG. 17

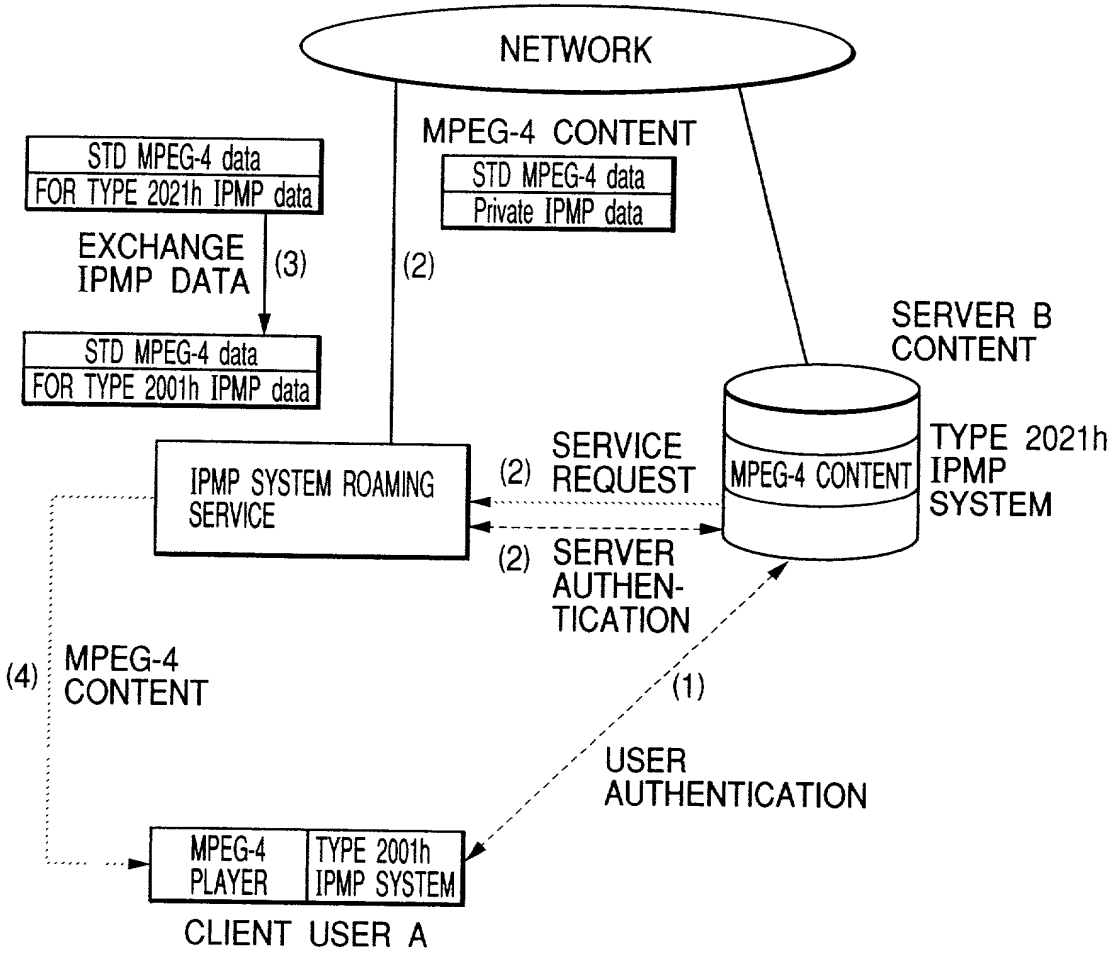

NETWORK
MPEG-4 CONTENT
STD MPEG-4 data
Private IPMP data
STD MPEG-4 data
FOR TYPE 2021h IPMP data
EXCHANGE IPMP DATA
(3)
STD MPEG-4 data
FOR TYPE 2001h IPMP data
(2)
SERVER B CONTENT
MPEG-4 CONTENT
TYPE 2021h IPMP SYSTEM
IPMP SYSTEM ROAMING SERVICE
(2) SERVICE REQUEST
(2) SERVER AUTHEN-TICATION
(4) MPEG-4 CONTENT
(1)
USER AUTHENTICATION
MPEG-4 PLAYER
TYPE 2001h IPMP SYSTEM
CLIENT USER A

FIG. 18

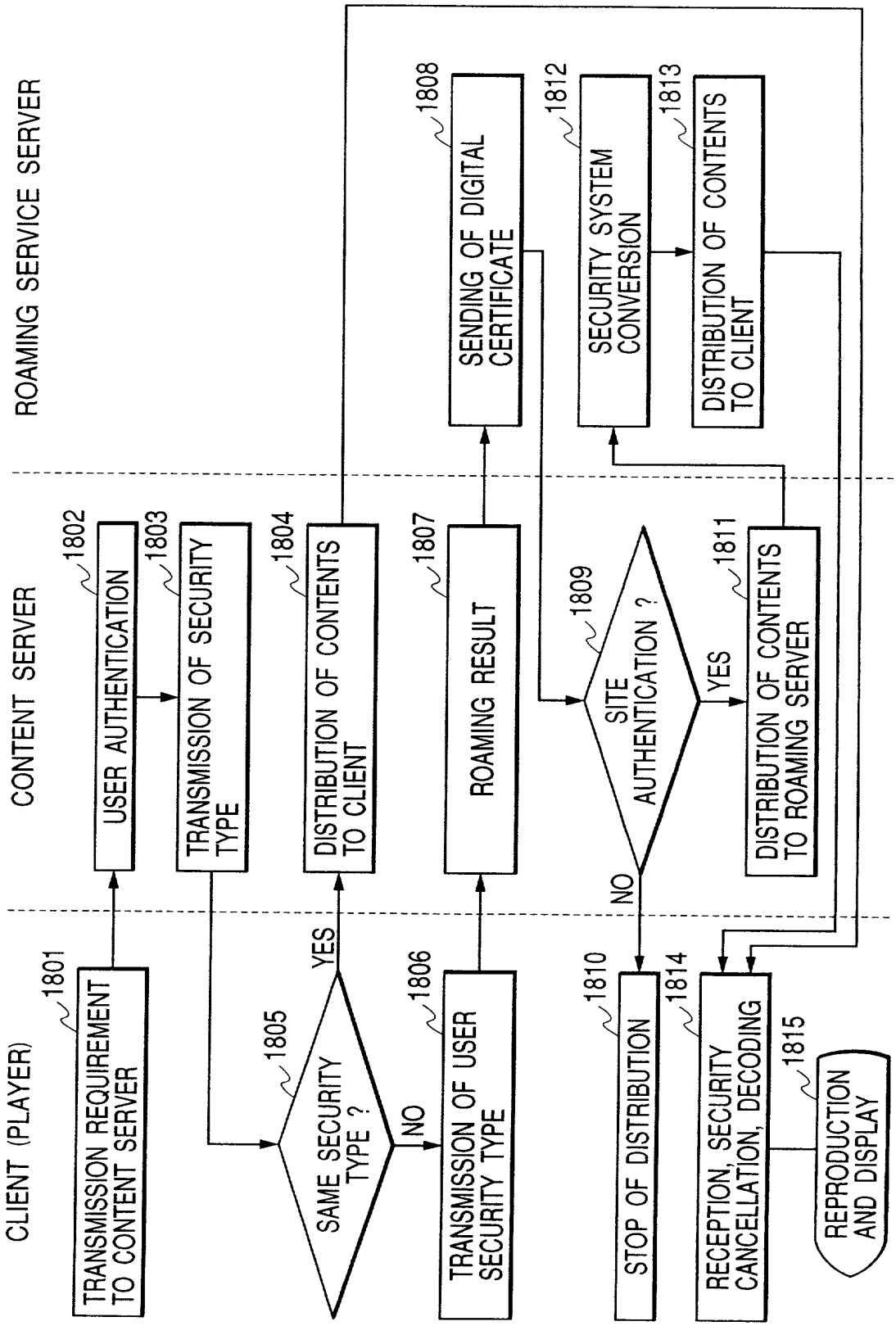

CLIENT (PLAYER)
CONTENT SERVER
ROAMING SERVICE SERVER
1801
TRANSMISSION REQUIREMENT TO CONTENT SERVER
1802
USER AUTHENTICATION
1803
TRANSMISSION OF SECURITY TYPE
1804
DISTRIBUTION OF CONTENTS TO CLIENT
1805
SAME SECURITY TYPE ?
YES
NO
1806
TRANSMISSION OF USER SECURITY TYPE
1807
ROAMING RESULT
1808
SENDING OF DIGITAL CERTIFICATE
1809
SITE AUTHENTICATION ?
YES
NO
1810
STOP OF DISTRIBUTION
1811
DISTRIBUTION OF CONTENTS TO ROAMING SERVER
1812
SECURITY SYSTEM CONVERSION
1813
DISTRIBUTION OF CONTENTS TO CLIENT
1814
RECEPTION, SECURITY CANCELLATION, DECODING
1815
REPRODUCTION AND DISPLAY

FIG. 19

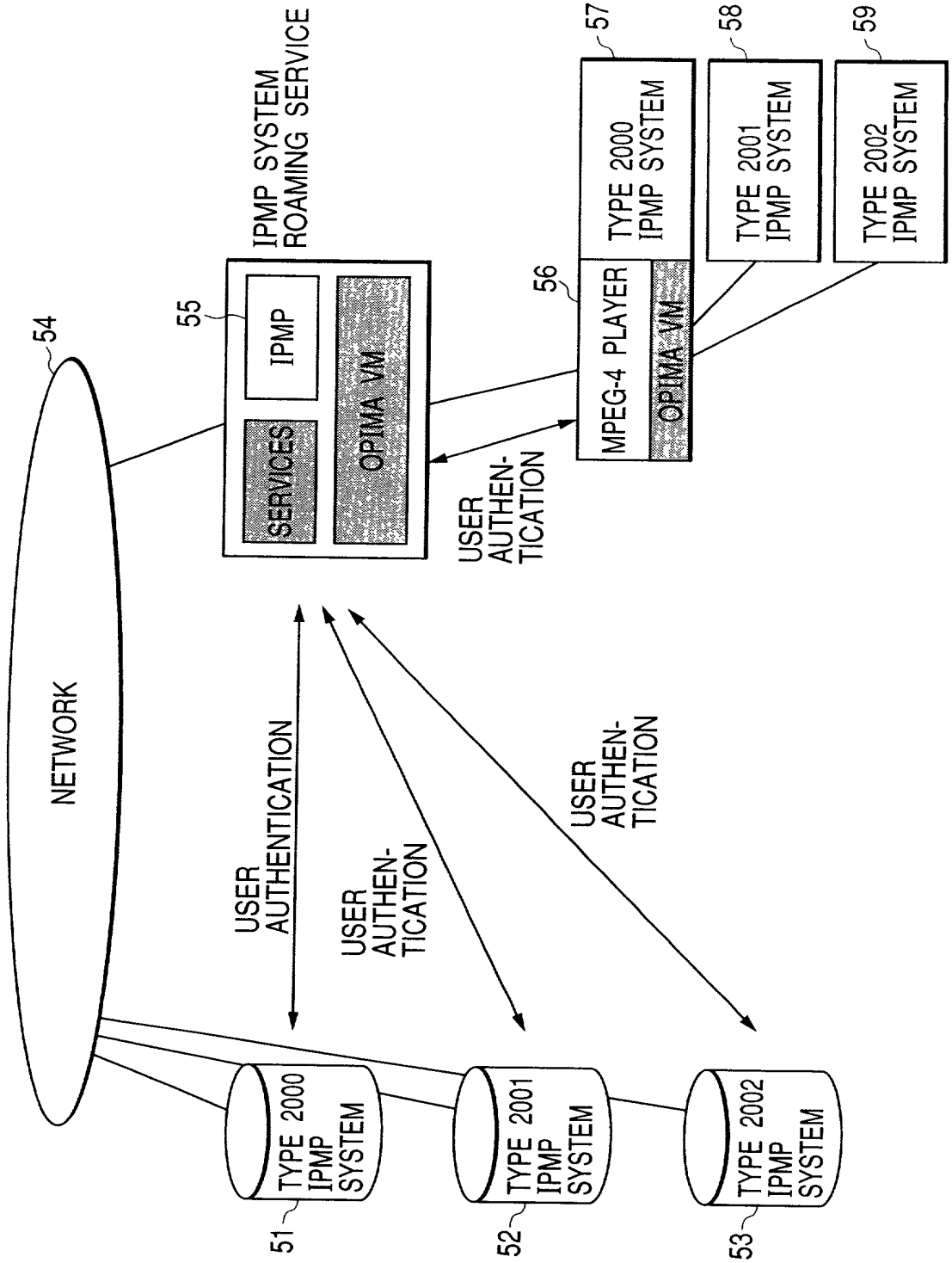

NETWORK
54
IPMP SYSTEM ROAMING SERVICE
55
IPMP
SERVICES
OPIMA VM
56
MPEG-4 PLAYER
OPIMA VM
57
TYPE 2000 IPMP SYSTEM
58
TYPE 2001 IPMP SYSTEM
59
TYPE 2002 IPMP SYSTEM
USER AUTHENTICATION
USER AUTHEN-TICATION
USER AUTHEN-TICATION
USER AUTHEN-TICATION
TYPE 2000 IPMP SYSTEM
51
TYPE 2001 IPMP SYSTEM
52
TYPE 2002 IPMP SYSTEM
53

FIG. 20

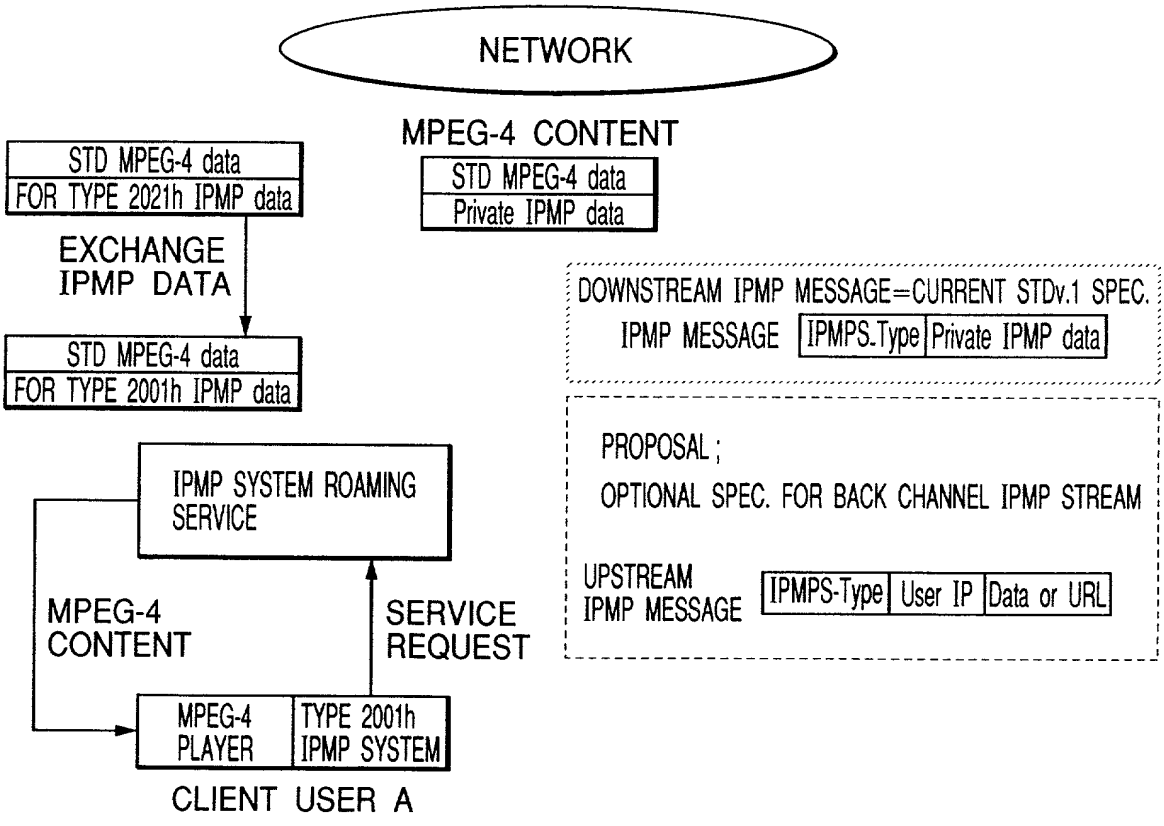

NETWORK
MPEG-4 CONTENT
STD MPEG-4 data
Private IPMP data
STD MPEG-4 data
FOR TYPE 2021h IPMP data
EXCHANGE
IPMP DATA
STD MPEG-4 data
FOR TYPE 2001h IPMP data
DOWNSTREAM IPMP MESSAGE=CURRENT STDv.1 SPEC.
IPMP MESSAGE
IPMPS.Type
Private IPMP data
IPMP SYSTEM ROAMING SERVICE
PROPOSAL ;
OPTIONAL SPEC. FOR BACK CHANNEL IPMP STREAM
MPEG-4 CONTENT
SERVICE REQUEST
UPSTREAM IPMP MESSAGE
IPMPS-Type
User IP
Data or URL
MPEG-4 PLAYER
TYPE 2001h IPMP SYSTEM
CLIENT USER A

FIG. 21

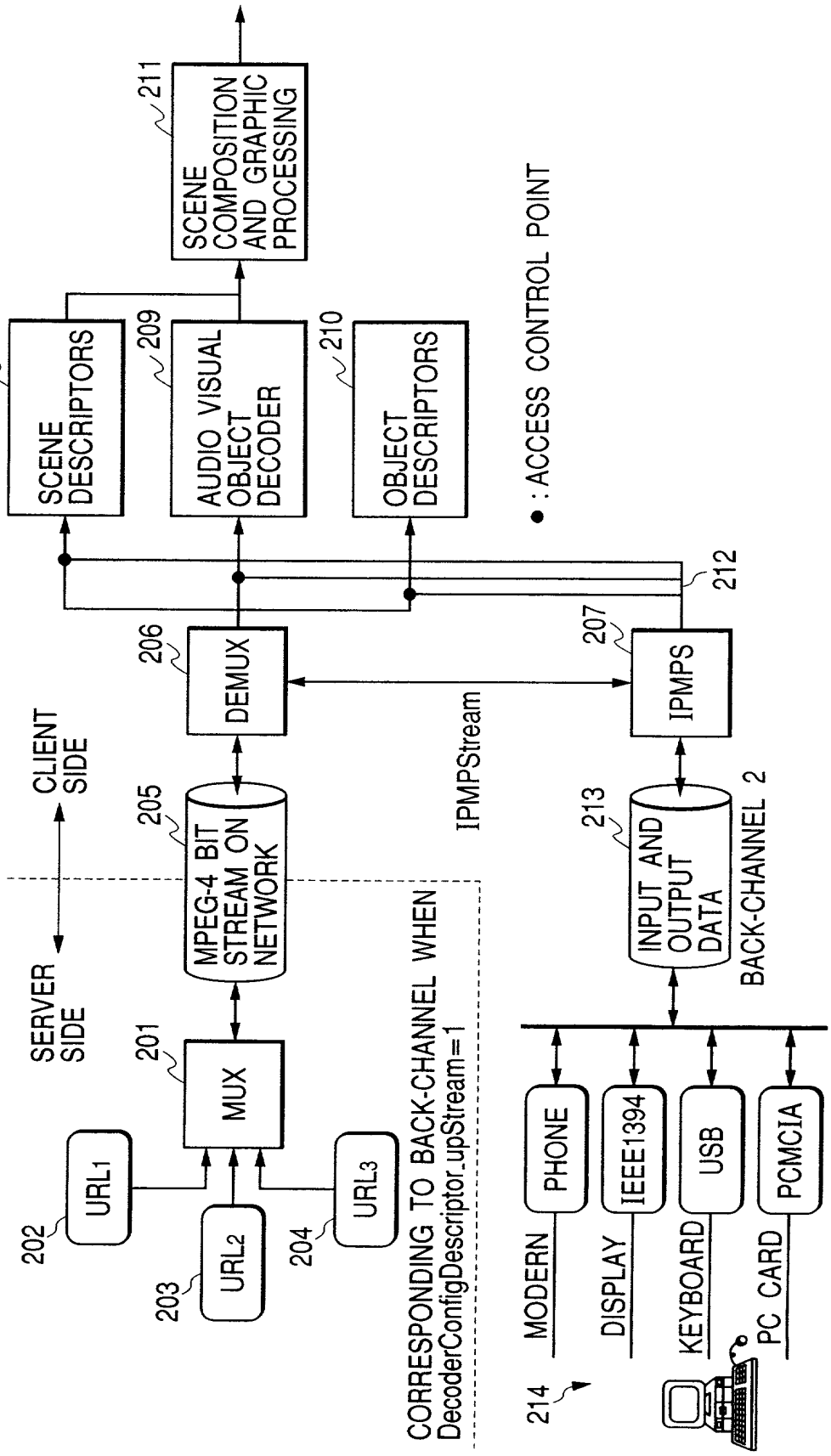

SCENE COMPOSITION AND GRAPHIC PROCESSING
211
SCENE DESCRIPTORS
208
AUDIO VISUAL OBJECT DECODER
209
OBJECT DESCRIPTORS
210
● : ACCESS CONTROL POINT
212
DEMUX
206
IPMPS
207
CLIENT SIDE
SERVER SIDE
MPEG-4 BIT STREAM ON NETWORK
205
IPMPStream
INPUT AND OUTPUT DATA
213
BACK-CHANNEL 2
MUX
201
URL1
202
URL2
203
URL3
204
CORRESPONDING TO BACK-CHANNEL WHEN DecoderConfigDescriptor_upStream=1
MODERN
PHONE
DISPLAY
IEEE1394
KEYBOARD
USB
PC CARD
PCMCIA
214

FIG. 22

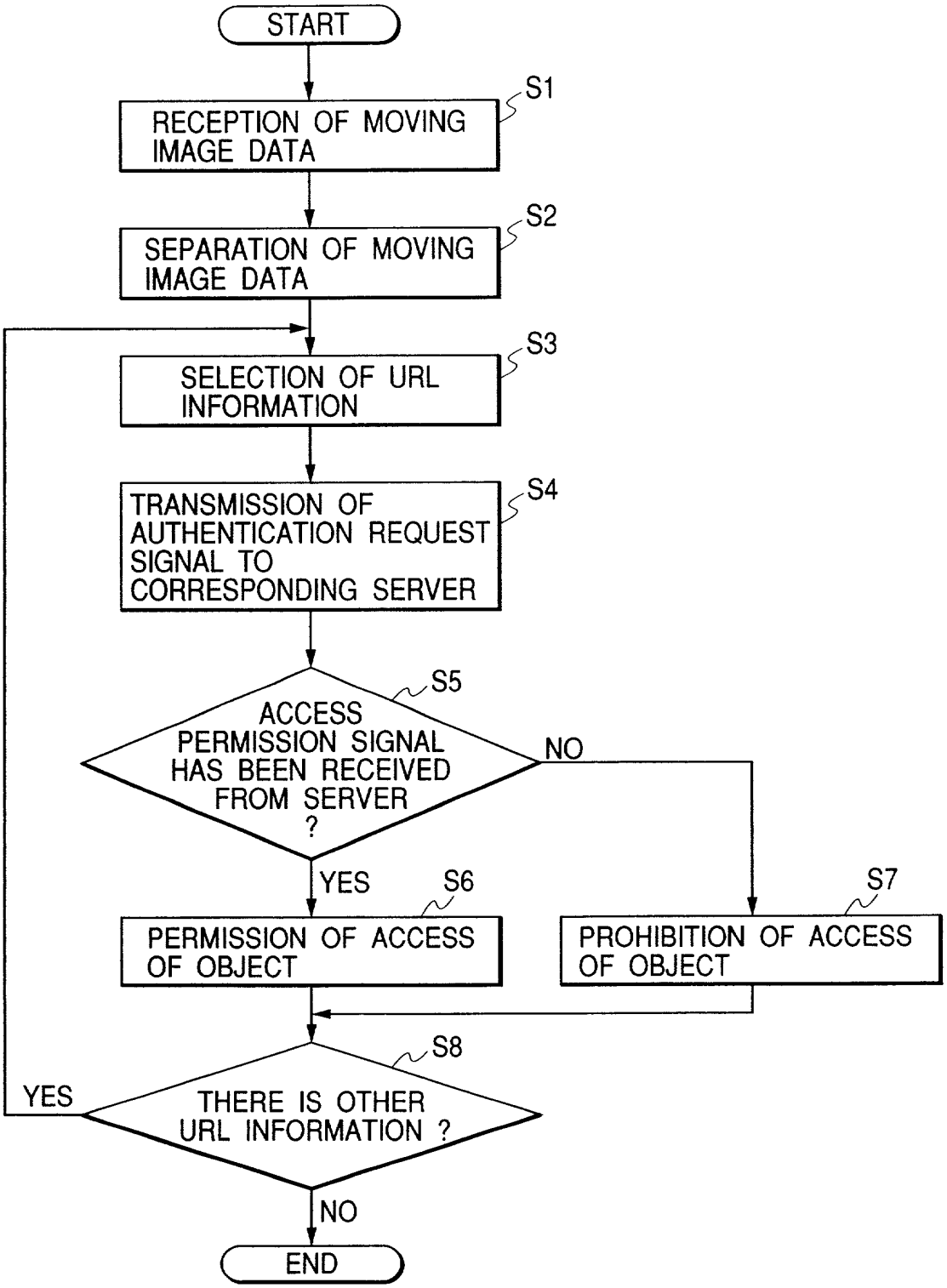

START
RECEPTION OF MOVING IMAGE DATA
S1
SEPARATION OF MOVING IMAGE DATA
S2
SELECTION OF URL INFORMATION
S3
TRANSMISSION OF AUTHENTICATION REQUEST SIGNAL TO CORRESPONDING SERVER
S4
ACCESS PERMISSION SIGNAL HAS BEEN RECEIVED FROM SERVER ?
S5
NO
YES
S6
PERMISSION OF ACCESS OF OBJECT
S7
PROHIBITION OF ACCESS OF OBJECT
S8
YES
THERE IS OTHER URL INFORMATION ?
NO
END

FIG. 23

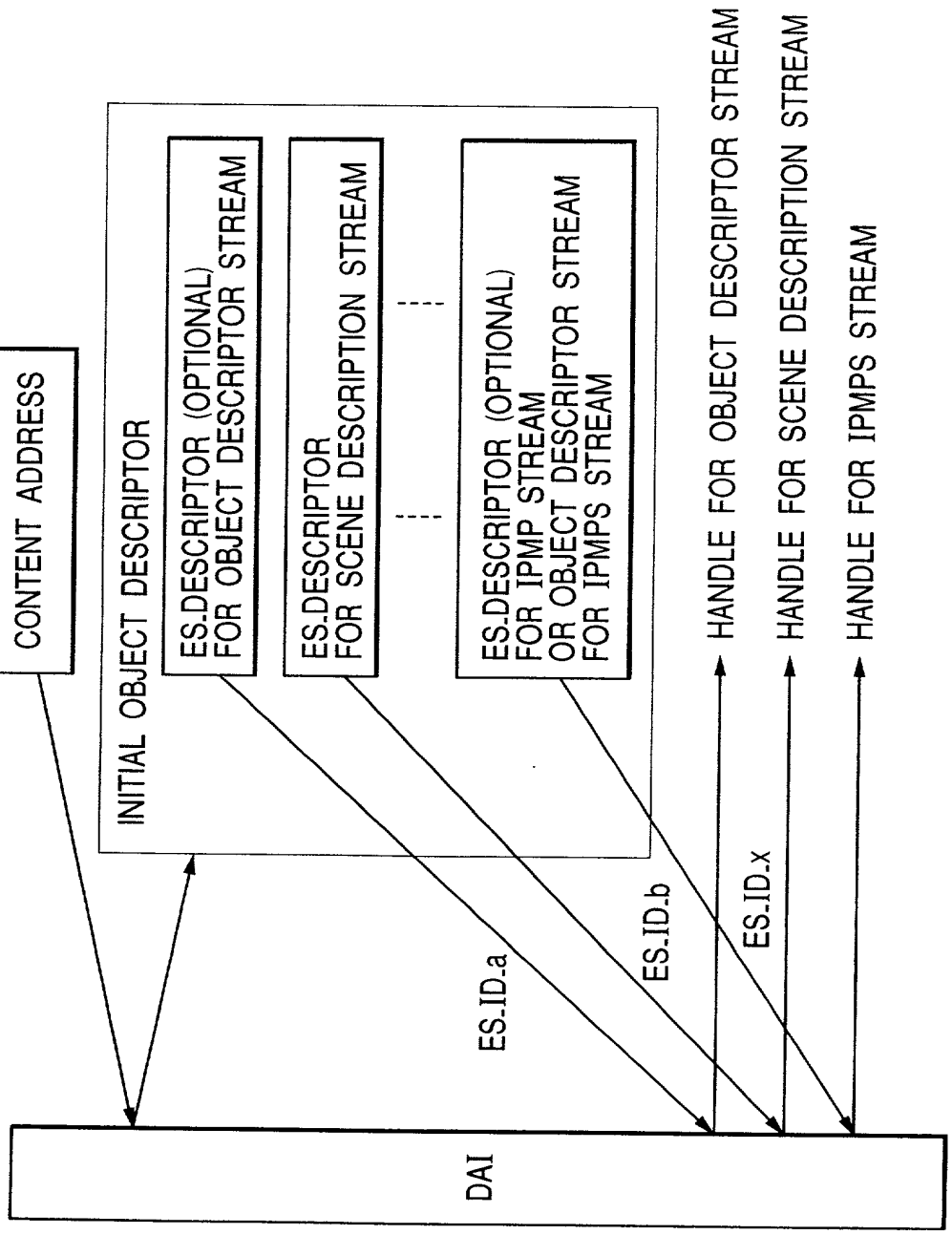
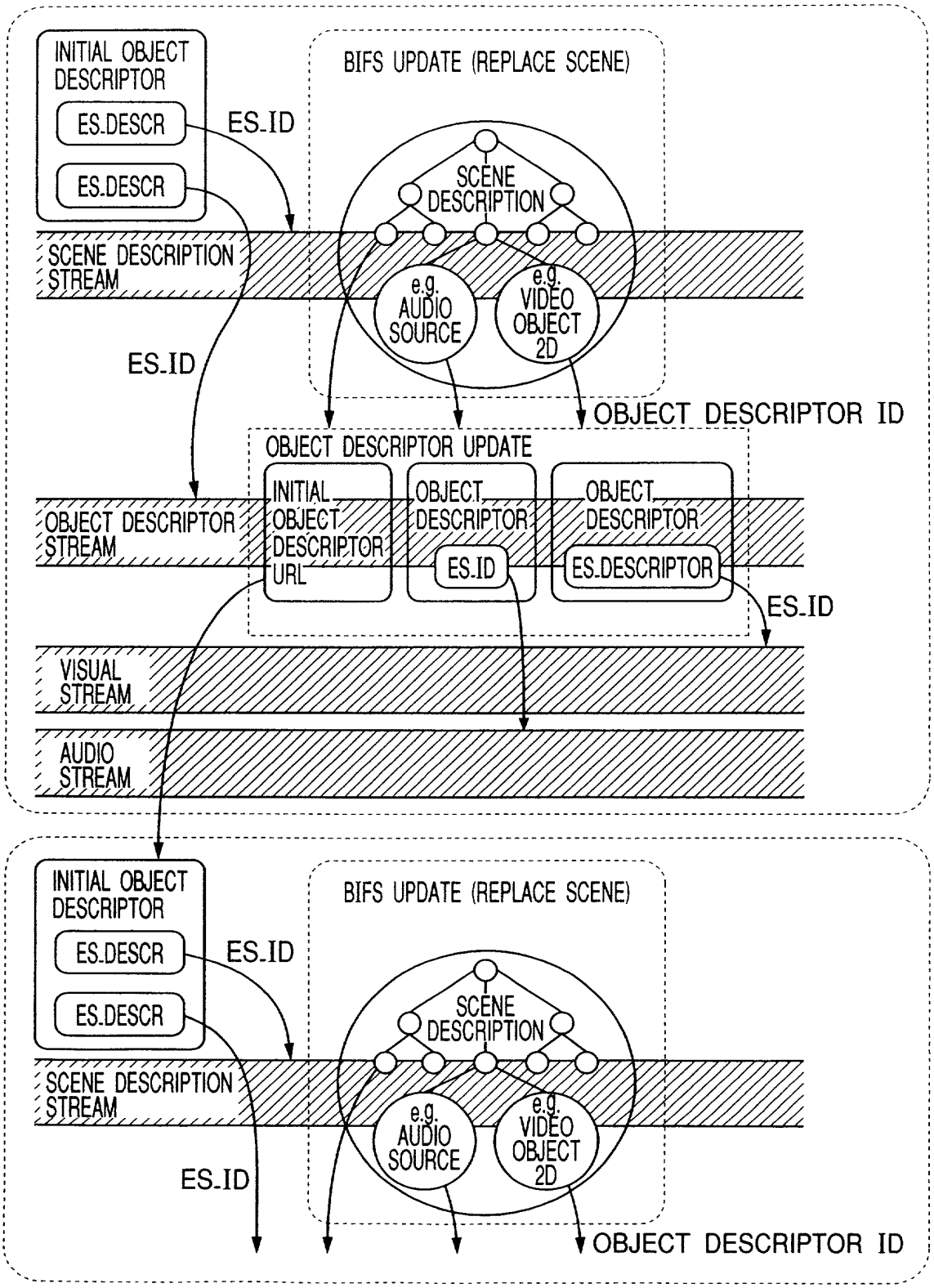

CONTENT ADDRESS
INITIAL OBJECT DESCRIPTOR
ES.DESCRIPTOR (OPTIONAL)
FOR OBJECT DESCRIPTOR STREAM
ES.DESCRIPTOR
FOR SCENE DESCRIPTION STREAM
ES.DESCRIPTOR (OPTIONAL)
FOR IPMP STREAM
OR OBJECT DESCRIPTOR STREAM
FOR IPMPS STREAM
ES.ID.a
ES.ID.b
ES.ID.x
HANDLE FOR OBJECT DESCRIPTOR STREAM
HANDLE FOR SCENE DESCRIPTION STREAM
HANDLE FOR IPMPS STREAM
DAI

FIG. 24


INITIAL OBJECT DESCRIPTOR
ES_DESCR
ES_DESCR
ES_ID
BIFS UPDATE (REPLACE SCENE)
SCENE DESCRIPTION
SCENE DESCRIPTION STREAM
e.g. AUDIO SOURCE
e.g. VIDEO OBJECT 2D
ES_ID
OBJECT DESCRIPTOR ID
OBJECT DESCRIPTOR UPDATE
OBJECT DESCRIPTOR STREAM
INITIAL OBJECT DESCRIPTOR URL
OBJECT DESCRIPTOR
ES_ID
OBJECT DESCRIPTOR
ES_DESCRIPTOR
ES_ID
VISUAL STREAM
AUDIO STREAM
INITIAL OBJECT DESCRIPTOR
ES_DESCR
ES_DESCR
ES_ID
BIFS UPDATE (REPLACE SCENE)
SCENE DESCRIPTION
SCENE DESCRIPTION STREAM
e.g. AUDIO SOURCE
e.g. VIDEO OBJECT 2D
ES_ID
OBJECT DESCRIPTOR ID